

In the Claims:

1. (Previously Presented) A thermoform process comprising the steps of:

placing a first sheet in a first frame and transferring the first sheet into an oven,
wherein said first sheet is low pressure, thermoformable, thermoplastic composite
comprised of polypropylene and long chopped glass fibers;

heating the first sheet in the oven to a predetermined temperature;

placing a second sheet in a second frame and transferring the second sheet into the
oven or, if available, an alternate oven, wherein said second sheet is low pressure,
thermoformable, thermoplastic composite comprised of polypropylene and long chopped
glass fibers;

heating the second sheet in the oven to a predetermined temperature;

transferring the heated first sheet to a thermoforming mold having matched mold
halves;

transferring a cover-stock material to the thermoforming mold having matched
mold halves;

compressing and fusing the cover-stock material to the first sheet forming a
compression molded covered first headliner part;

repeating the process until a sufficient number of compression molded covered first
headliner parts are formed;

removing the matched mold halves and setting up the mold for vacuum
thermoforming with a lower half mold and an opposing half mold;

transferring the compression molded covered first headliner part to the lower half mold of a vacuum thermoforming mold;

transferring the second sheet onto the opposing half mold of the vacuum thermoforming mold;

vacuum molding the second sheet forming a vacuum molded second headliner part;

compressing the half molds of the thermoforming mold fusing regions of the compression molded covered first headliner part to the vacuum molded second headliner part, thereby forming a covered unified part comprised of said compression molded covered first headliner part and said vacuum molded second headliner part, where said covered unified part has at least one interior compartment with head impact cushioning; and

ejecting the covered unified part.

2. (Previously Presented) The thermoform process as claimed in claim 1, wherein said low pressure composite has a flexural modulus of about 900 MPa to about 1800 MPa as determined by ASTM D792.

3. (Previously Presented) The thermoform process as claimed in claim 1, wherein said low pressure composite has a flexural modulus of about 900 MPa to about 1800 MPa as determined by ASTM D792.

4. (Canceled).

5. (Previously Presented) The thermoform process as claimed in claim 1, wherein the vacuum molded second headliner part is further comprised of a layer of a fusing adhesive.

6. (Canceled)

7. (Canceled).

8. (Canceled)

9. (Previously Presented) The thermoform process as claimed in claim 1, wherein the cover stock material is comprised of a fabric, a film, or a felt, or a fur, or a leather.

10. (Previously Presented) The thermoform process according to claim 1, wherein the cover stock material is further comprised of an underlying layer of foam.

11. (Previously Presented) The thermoform process according to claim 1, wherein the cover stock material is further comprised of an intra-layer adhesive.

12. (Previously Presented) The thermoform process as claimed in claim 5, wherein compressing the half molds of the thermoforming mold fuses the layer of adhesive on the vacuum molded second headliner part to the compression molded covered first headliner part, thereby forming an adhesively laminated covered unified part.

13. (Previously Presented) A thermoform process comprising the steps of:

placing a first sheet in a first frame and transferring the first sheet into an oven;

heating the first sheet in the oven to a predetermined temperature;

placing a second sheet in a second frame and transferring the second sheet into the oven or, if available, an alternate oven;

heating the second sheet in the oven to a predetermined temperature;

transferring the heated first sheet to a thermoforming mold having matched mold halves;

transferring a cover-stock material to the thermoforming mold having matched mold halves;

compressing and fusing the cover-stock material to the first sheet forming a compression molded covered first headliner part;

heating the second sheet in the oven to the predetermined temperature, transferring the heated second sheet to a thermoforming mold having matched mold halves;

transferring a reinforcing scrim material to the thermoforming mold having matched mold halves;

compressing and fusing the reinforcing scrim material to the second sheet forming a compression molded scrim reinforced second headliner part;

repeating the process until a sufficient number of compression molded covered first headliner parts and compression molded scrim reinforced second headliner parts are formed;

removing the matched mold halves and setting up the mold for vacuum thermoforming with a lower half mold and an opposing half mold;

transferring the compression molded covered first headliner part to the lower half mold of a vacuum thermoforming mold;

transferring the second sheet onto the opposing half mold of the vacuum thermoforming mold;

transferring and positioning the compression molded scrim reinforced second headliner part onto the opposing half mold of the vacuum thermoforming mold;

compressing the half molds of the thermoforming mold fusing regions of the compression molded covered first headliner part to the compression molded scrim reinforced second headliner part, thereby forming a reinforced covered unified part consisting of said compression molded covered first headliner part and said compression molded scrim reinforced second headliner part, where said reinforced covered unified part has at least one interior compartment with head impact cushioning; and

ejecting the reinforced covered unified part.

14. (Previously Amended) The thermoform process according to claim 13, wherein the cover stock material of the compression molded covered first headliner part is further comprised of an underlying layer of foam.

15. (Previously Amended) The thermoform process according to claim 14, wherein the cover stock material of the compression molded covered first headliner part is further comprised of an intra-layer adhesive.

Claims 16 –19 are Canceled.

20. (Previously Presented) The thermoform process as claimed in claim 1, wherein the covered unified part is a headliner.

21. (Canceled)

22. (Canceled)

23. (Previously Presented) A thermoform process according to claim 1, further comprising the step of:

after compressing the half molds of the thermoforming mold fusing the compression molded covered first headliner part to the vacuum molded second headliner part thereby forming the covered unified part; injecting foam into the interior compartment.

24. (Previously Presented) A thermoform process according to claim 1, further comprising the step of:

after compressing the half molds of the thermoforming mold fusing the compression molded covered first headliner part to the vacuum molded second headliner part thereby forming the covered unified part; injecting insulation into the interior compartment.

25. (Previously Presented) A thermoform process according to claim 13, further comprising the step of:

after compressing the half molds of the thermoforming mold fusing the compression molded covered first headliner part to the vacuum molded second headliner part thereby forming the reinforced covered unified part; injecting insulation into the interior compartment.

26. (Canceled)

27. (Previously Presented) A thermoform process according to claim 13, further comprising the step of:

after compressing the half molds of the thermoforming mold, fusing the compression molded covered first headliner part to the compression molded reinforced scrim second headliner part thereby forming the covered reinforced scrim unified part; injecting foam into the interior compartment.

28. (Canceled)

29. (Currently amended) A thermoform process according to claim 1, further comprising the step of:

prior to compressing the half molds of the thermoforming mold fusing the compression molded covered first headliner part to the vacuum molded second headliner part thereby forming the covered unified part; positioning wiring, duct work and reinforcing components, ~~and acoustic enhancing materials~~ into what will become the interior compartment.

30. (Previously Presented) A thermoform process according to claim 1, is further comprised of the step of:

trimming and finishing the covered unified part, where finishing is selected from the processes consisting of:

secondary punching, laser, knife trimming, and vibration, ultrasonic and hot plate welding.

31. (Canceled)

32. (Canceled)

33. (Previously Presented) A thermoform process according to claim 1, further comprising the step of:

after placing a first sheet in the first frame, transferring the first sheet into a preheat oven;

preheating the first sheet to a predetermined temperature.

34. (Previously Presented) A thermoform process according to claim 33, further comprising the step of:

after placing a second sheet in the second frame, transferring the second sheet into a preheat oven;

preheating the second sheet to a predetermined temperature.

35. (Withdrawn) A headliner for a vehicle having excellent head impact countermeasures (HIC) properties, said headliner comprises:

a first headliner part having a liner side and an opposing side, wherein the first headliner part has a molded shape that is substantially the visible form for the headliner as seen inside the vehicle;

a second headliner part having a roof side and a compartment side, wherein the second headliner part is molded to reinforce the first sheet, attach the headliner to the roof, form at least one interior compartment with flexible walls when combined with the first headliner part, and form an intra-panel space between the roof and the second headliner part;

wherein the opposing side of the first sheet and the compartment side of the second headliner part are adhered to each other, therein forming the least one interior compartment that has excellent head impact countermeasures (HIC) properties; and
wherein the intra-panel space produces sound dampening.

36. (Withdrawn) The headliner as claimed in claim 35, wherein the first headliner part is a first sheet of a low pressure, thermoformable, thermoplastic composite comprised of polypropylene and long chopped glass fibers.

37. (Withdrawn) The headliner as claimed in claim 36, wherein the second headliner part is a second sheet of a low pressure, thermoformable, thermoplastic composite comprised of polypropylene and long chopped glass fibers.

38. (Withdrawn) The headliner as claimed in claim 37, wherein the first sheet has a flexural modulus between 900 and 1800 MPa (ASTM D792), and a multi-axial impact between 5 and 7 J (ASTM D3763).

39. (Withdrawn) The headliner as claimed in claim 38, wherein the second sheet has a flexural modulus between 900 and 1800 MPa (ASTM D792), and a multi-axial impact between 5 and 7 J (ASTM D3763).

40. (Withdrawn) A headliner according to claim 35, wherein the first headliner part further comprises a cover-stock material fused to the liner side.

41. (Withdrawn) The headliner as claimed in claim 40, wherein the cover stock material is comprised of a fabric, a film, a felt, or a skin such as a fur or a leather.

42. (Withdrawn) The headliner as claimed in claim 41, wherein between the cover stock material and the first sheet is an intra-layer adhesive.

43. (Withdrawn) The headliner as claimed in claim 41, wherein the cover stock material has sound dampening properties.

44. (Withdrawn) The headliner as claimed in claim 40, wherein the cover stock material is further comprised of an underlying layer of foam.

45. (Withdrawn) A headliner according to claim 35, wherein the second headliner part further comprises a reinforcing scrim material that is bonded to the roof side of the second headliner part.

46. (Withdrawn) A headliner according to claim 35, wherein the second headliner part is further comprised of a layer of a fusing adhesive on the compartment side of the second headliner part.

47. (Withdrawn) A headliner according to claim 46, wherein the first headliner part is further comprised of a layer of a fusing adhesive on the opposing side of the first headliner part.

48. (Withdrawn) The headliner according to claim 47, wherein the layer of fusing adhesive on the compartment side of the second headliner part is fused with the fusing adhesive layer of adhesive on the opposing side of the first headliner part.